Finance 510-B

Problem Set 6

Work on individually. Due via e-mail on Monday, March 8, at 2:00 pm Tucson time.

Submit on a spreadsheet whose name includes your name.

Your sister's husband just inherited a 130 acre tract of land in Yavapai County that contains a small, long-abandoned copper mine. It is near the Bagdad mine that is owned and operated by Freeport-McMoRan. As soon as they found out that your brother-in-law, Charles Foster, inherited the land, Freeport-McMoRan made him an offer to buy the land for $20,000 per acre, which they claim to be a generous price. Charles is inclined to agree as it looks as though the land could end up costing him a lot of money. Specifically, he has to pay a security company $25,000 per year to keep unwanted visitors away, and maintain the protective perimeter. Property tax amounts to $250 per acre, per year. Also were he to convert the property to general use, he would have to pay $200,000 in clean-up costs. Were he to clean up the land and put it on the market for general use area realtors estimate that it could be sold for $8,000 per acre.

He came to you for advice a few months back. You know that copper prices have been rising to historically high levels, so you sent CF away with a few key questions about the mine. CF just came back with the following additional information:

- This land is part of CF's business empire that is currently very profitable so that it could take advantage of any tax shields from this project when realized. The marginal corporate tax rate for this business is 25%. This business has no debt, is family owned, and uses a cost of equity of 10%.
- Since the land was just inherited, there are no capital gains tax considerations as concerns selling the land or starting a mining operation on it.
- Geological surveys suggest that the mine could produce at a rate of 700,000 pounds of copper per year for 25 years, before running out of reserves.
- Starting up the mine would incur a one-time (tax deductible) switching cost of $1,750,000, as well as a capital outlay of $2 million for equipment that must be depreciated over a 5-year life (under MACRS).
- Although the $2 million worth of equipment is depreciated on a 5-year basis, it will have to be replaced after 12 years, at which time it would have 0 salvage value. We can assume that the cost of the equipment would be the same as today. At that point the new equipment should survive for the rest of the mine's productive life.
- Variable costs of running the mine at full capacity amount to $85,000 per month. This includes wages, etc. for extraction and operating the concentrator.
- Yavapai County would raise the assessed value of the property if we were to start mining operations. CF estimates that the property tax would increase to $5,000 per acre annually. This is a tax-deductible expense for federal income tax purposes.

- Phoenix-based Minesweepers, Inc. has provided a competitive bid, that if the mine were operational (which it currently is not), they would be willing to take it off our hands provided we pay them \$3 million in a "turn-key" deal. Otherwise we have to continue to operate the mine once we have started mining operations. So Minesweepers provides the only viable exit strategy once we start operating the mine, and we can execute it at any time. This is the only regulatorily acceptable way to exit an operating mine, and it would receive a special tax treatment. The \$3 million payment is not a tax deductible expense and we surrender control over the land and all assets on the land with no residual tax consequences (either positive or negative).
- Currently the spot price of copper is \$4.40 per pound. Given uncertainties concerning the Covid-19 pandemic as well as conditions in Argentina, Chile, and Indonesia, analysts agree that in one year there is a 30% probability that this price will be \$6.40 per pound, a 40% probability that the price will be \$2.85 per pound, and a 30% chance that this price will be \$1.85 per pound. After that the price is likely to fluctuate but these subsequent fluctuations should be relatively small and copper prices should keep up with inflation over the ensuing 25 years.
- Copper from the mine will be sold in the futures markets one year in advance, so if the mine opens immediately the first year's output would be sold at the prevailing price of \$4.40 per pound.
- If we choose not to sell to Freeport-McMoRan now they will commit to paying their current offer in a year if we pay them \$200,000 now.

What advice do you have for CF in this context? Provide a "traditional NPV" analysis and include a discussion of its usefulness as a decision tool.